



**FLYING J PETROLEUMS INC - WILLISTON
REFINERY FACT SHEET**

North Dakota Department of Health
Division of Waste Management

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1. **REFINERY NAME** - Flying J Petroleums Inc. - Williston Refinery
 2. **State/EPA ID#** - NDT390010049
 3. **ADDRESS AND LOCATION** -
RR 4, Box 177B
Williston, ND 58801
 4. **STATE CONTACT** - Christine Roob
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 5. **LEAD AGENCY** - North Dakota Department of Health, Division of Waste Management
 6. **SETTING AND OPERATIONS HISTORY**
The Flying J refinery was located north of the Missouri River, near the Little Muddy Creek. The refinery occupied about 42 acres and was built in the early 1950s. Refining activities have been shutdown since 1984 and commercial product storage activities ceased in 1986. During refinery operation, the principal products were gasoline and various grades of fuel oil. The former refinery consisted of seven buildings, a series of storage tanks, loading facilities for trucks and rail, ten major process units, and four RCRA wastewater surface impoundments containing listed wastes. The four RCRA surface impoundments were closed in 1988 by removing the sludge and visually stained soils and constructing an impermeable cap from clay backfill over the excavated areas. Demolition of most of the structures, tanks, and process units was initiated in November 1992 and completed in July 1994. Selected tanks and storage buildings were spared from demolition for their anticipated use during corrective action.
 7. **REGULATORY INSTRUMENT (PERMIT/ORDER)**
INSTRUMENT: Post-closure and corrective action permit
ISSUED BY: NDDH
DATE: Permit renewed July 7, 2004 and is in effect until July 7, 2009.
 8. **REGULATED UNITS**
There are four RCRA-regulated hazardous waste management units on-site. These were unlined surface impoundments, which were constructed in natural soil for the purpose of providing additional oil/water separation. Surface impoundments 1 and 2 (SWMUs 1 and 2) are on property now owned by Flying J Petroleums Inc. Surface impoundments 3 and 4 (SWMUs 3 and 4) were constructed on property owned by the United States, pursuant to an easement issued by the Omaha District USACE. Flying J has since purchased this property from the USACE. The four surface impoundments were operated in series and received flow from three API separators.

The surface impoundments were closed in 1988 by removing all hydrocarbon wastes and visibly stained soils, disposing of them at an off-site HW disposal facility, and covering the impoundments with an engineered cap to reduce leachate generation from infiltration.

9. **WASTE GENERATION/TREATMENT/DISPOSAL PRACTICES**

Wastes generated when the refinery was in operation included K049 Slop oil emulsion solids, K050 heat exchanger bundle cleaning sludge, K051 API separator sludge, and K052 leaded tank bottoms

10. **RCRA COMPLIANCE STATUS**

No compliance issues at this time

11. **POTENTIAL FOR RELEASES**

The RFA dated March 1989 identified sixty-four (64) SWMUs (four of which are RCRA-regulated HWMUs), and fifteen (15) AOCs. In 1990 two (2) additional SWMUs were identified; these were temporary waste management units (no longer in operation) consisting of hydrocarbon-contaminated soils and/or debris.

Over the past several years, Flying J has altered and removed some SWMUs. These actions included soil excavation, tank removal, disking, adding fertilizers, and "in situ" treatment. Flying J has also conducted "facility-wide" interim measures (pump and treat) for groundwater contamination from the SWMUs (see discussion below.) In addition, current information on several of the SWMUs and/or AOCs, as presented in the RFI submitted by Flying J, does not substantiate evidence of either a prior release or a need for corrective action for those SWMUs at this time.

The RFA of March 1989 indicated that the RCRA listed hazardous waste constituents detected at the Flying J facility in various samples of soil, water, sludge and sediments included the following: phenol (U188), naphthalene (U165), 2,4 dimethylphenol (U104), dibenzofuran (F027), pentachlorophenol (F027), fluoroanthene (U120), benzo(a)anthracene (U018), chrysene (U050), benzo(a)pyrene (U022), chromium (D007), Lead (D008). The RFA indicated that fourteen of the SWMUs had "very high" release potential, and fifteen of the SWMUs had "high" release potential.

12. **CORRECTIVE ACTION STATUS AND STABILIZATION ACTIVITIES**

A. Stabilization measures needed? Yes

B. Stabilization measures implemented? Yes (If yes, list measures)

In 1989 Flying J initiated interim measures to address the site groundwater contamination. They installed a system of four collection "lateral underdrains," two at the northern end of the facility and two at the southern end. These laterals are perforated drains that intercept free phase product and contaminated groundwater in the upper sand/till. These fluids went to an oil/water separator, with water phase outflow discharged to a NPDES outfall (the "south drainage ditch"). Flying J also installed a groundwater recovery well for the lower sand. After 1993, Flying J began using a control device for the recovered ground water (a tray aeration unit) and then sends the treated water to the city of Williston's sanitary sewer. Since free product recovery is minimal and the dissolved BTEX plume is not migrating in the upper sand/till aquifer, the lateral underdrain system has been shutdown. The upper sand/till aquifer will continue to be monitored for natural attenuation.

Other stabilization measures include the removal of some SWMUs (soil excavation and tank removal), and the closure of the four RCRA-regulated surface impoundments in 1988.

- C. Have all necessary stabilization measures been completed (for all areas/units)?
Yes
- D. Current human exposures under control? Yes
- E. Current ground water releases under control? Yes
- F. RFI imposed for all areas/units? Yes - for those needing investigation
- G. RFI workplan approved? Yes
- H. RFI final report approved? Yes 8/92
- I. CMS Workplan approved? Yes
- J. CMS final report approved? Yes
- K. Was a human health risk assessment done (or is it being done)? Yes
- L. Was an ecological risk assessment done (or is it being done)? Yes
- M. Final Remedy selected? Yes
- N. Describe final remedy implemented:

The final corrective measures selected for implementation at the former refinery include the following remedial technologies:

- Soil Vapor Extraction (SVE) and Treatment with a possible later stage of Bioventing
36 SVE vertical wells and ten SVE horizontal wells were installed during the summer of 1995. During the initial operation in 1997-1999, the SVE system was operated so that recovered hydrocarbon vapors were extracted uniformly across the treatment area and were treated in the oxidizer. During the 2000-2003 operating seasons, the SVE system was operated to target treatment of "hot spots" that were identified by weekly SVE well/trench photoionization detector (PID) readings. Based on the results of SVE and bioventing, the Department considered the SVE and bioventing process complete as corrective measures and operation of these systems was discontinued in 2004.

- Hydrocarbon Product and Groundwater Recovery and Treatment

Four new lower sand groundwater/free product recovery wells were installed during the summer of 1995 and have been in operation since. In May 1999, Flying J obtained a portable, pneumatic, free product recovery pump to remove significant accumulations of free product from the monitoring wells located around the facility. These are currently in operation.

- *In Situ* Landfarming of Surface Soils

Since 1997 soils located along the South Drainage Ditch were overturned twice a year to promote bio-degradation of hydrocarbon contaminants. Soil sampling results no longer detected VOCs or PAHs in the south drainage ditch. Landfarming and soil sample collection in the South Drainage Ditch was discontinued in 2003.

In 2004 Flying J initiated landfarming in the former operating area of the refinery that had undergone SVE. Risk-based concentrations (RBCs) were established for contaminated soils in the risk assessment presented in the CMS Report and served as the cleanup goals for the treatment of contaminated soils by landfarming. After two seasons of landfarming all concentrations were between or below the RBCs. Based on these results, in-situ landfarming has met its cleanup goal and is considered complete.

- Site Irrigation and Revegetation

An irrigation system was installed in 1997 to enhance vegetative cover throughout the area disturbed by site demolition and CMI construction activities. Irrigation will continue to occur as needed.

- Enhanced Fluids Recovery Treatment/Product Removal by Hand Bailing

Since the shutdown of the Upper Sand/Till Recovery System, EFRT and hand bailing have not been performed.

In addition, site security, inspection, and other institutional controls will be maintained by Flying J to control land use and prevent potential exposure to soil and groundwater in the vicinity of the site.

O. Has a TI waiver been requested? No

P. CMI initiated? Yes

Q. CMI completed? Yes

R. Other relevant corrective action status information: The facility is currently in operation and maintenance mode.

13. **COMMUNITY INVOLVEMENT**

None.

14. **MAJOR UPCOMING ACTIVITIES**

None.

15. **PROBLEMS/ISSUES**

None.